REMARKS/ARGUMENTS

This is a reply to the Final Office Action dated May 3, 2007.

Claims 1-12 are currently pending in this application. Claims 1-4 have been withdrawn. New claims 11 and 12 have been added. No claim is canceled. Claims 5-10 are currently amended.

Claims 5-10 have been amended based on the specification descriptions provided at page 8, lines 17-26, and elsewhere in the present application. New claims 11 and 12 have support at page 8, lines 17-23, and elsewhere in the present application. No new matter has been introduced by this amendment.

Information Disclosure Statement

An Information Disclosure Statement is being filed concurrently herewith, which cites a co-pending application Ser. No. 10/794,315, and other documents, for the Examiner's consideration.

Response to 35 U.S.C. §112, 2nd paragraph, indefiniteness rejection

Claims 5 and 6 were rejected under 35 U.S.C. §112, second paragraph, for indefiniteness.

The Office Action indicates that claims 5 and 6 recite a nonwoven fabric comprised of two layers that are "in a directly adjacent hydroentangled united arrangement", and urges that the "process of hydroentanglement will mix the fibers so it is not clear how the one layer consists essentially of two types of fiber." Applicants traverse for the following reasons.

Applicants respond that the resultant fabric of the present invention is a composite fabric having two discrete distinguishable nonwoven layers, as described in the present application (*e.g.*, page 5, line 12 to page 6, line 10; original claims 5 and 6). As explained in the present application, first and second *precursor webs* are hydroentangled to form the nonwoven fabric having the first and second *layers*. The first and second precursor webs are united with an intermingling of the two precursor webs at their interface with hydroentangling processing. After hydroentanglement, first and second nonwoven layers are present as claimed, and without having been transformed into a single-layered homogeneous mixture of all the fibers of the original two precursor webs. No factual evidence of record brings into doubt or question the characterization of the invention in the present application. It is respectfully submitted that examination should

proceed based on the invention as claimed by the Applicants.

The "sufficiently absent" language has been deleted from claims 5 and 6.

In view of at least the above reasons, the Applicants submit that the present claims are sufficiently definite and precise to meet the requirements of 35 U.S.C. §112, second paragraph.

In view of the above, reconsideration and withdrawal of this rejection is requested.

Response to 35 U.S.C. §103(a) obviousness rejection of Claims 5-10

Claims 5-10 have been rejected as being obvious under 35 U.S.C. §103(a) over Paire (US 5,236,769) in view of Kelly (US 2002/0004348) and Kierulff (US 6660503).

The present invention is directed towards a structurally stable, hydroentangled, flame-retardant nonwoven fabric comprising a first and a second layer. The first layer is a blend of lyocell fiber and modacrylic fiber, and the second layer is a blend of lyocell fiber, modacrylic fiber, and para-aramid fiber. The lack of para-amid fiber in the first layer of the flame-retardant nonwoven fabric of the present invention masks the discoloration of the second layer that may occur from the presence of the para-amid fiber therein (see specification: page 4, lines 14-18).

None of the references relied upon in the grounds of rejection teach or suggest the claimed invention, individually or in the combination suggested in the Office Action.

Paire does not teach same materials and structure as the current application. Paire teaches a composite lining for a garment that consists of at least three layers: a needle-punched heat stable textile layer (3), a film (6) adhesively bonded to the textile layer (3), and a needle-punched reinforced nonwoven 8 that is combined with the heat stable textile layer (3) via needle-punching (see col. 2, line 46 to col. 5, line 42). The textile layer (3) is described as formed from heat-stable fibers of the *aramid* family, a mixture of wool (30-50%) treated to be flame retardant or non-treated and heat-stable fibers, or use also can be made of fibers identified as meta-aramid, para-aramid, polyamide-imide, polyacrylate, polybenzimidazole, aromatic copolyamide, polyacrylonitrile oxide, polyacrylate, phenylene polysulfide, polyester, polyether or polyketone, *FR viscose*, *FR cotton* or of a phenolic compound or otherwise fluorocarbon or *modacrylic* compounds, and the use of mixtures of these heat-stable or heat-cross-linked fibers is suggested (emphasis added; col. 2, line 53 to col. 3, line 2). As specifically explained by Paire, the fibers used in textile layer (3) are either heat-stable by nature or flame-retarded subsequent to their manufacture (col. 3, lines 3-8). As to reinforced nonwoven (8), Paire indicates that this layer

also must be resistant to heat and flames, and it is exemplified in the reference as constituted by a mixture of heat-stable fibers and wool or viscose (col. 4, lines 55-60).

Regarding textile layer (3) of Paire, lyocell fiber is not identified as a useful fiber by that reference, nor its use in combination with modacrylic fiber and para-amid fiber in particular. Unlike the recitations of present claims 5-10, Paire does not teach a "second layer" consisting of a blend of lyocell fiber, modacrylic fiber, and para-amid fiber. Paire also fails to teach a "first layer" consisting of a blend of lyocell fiber and modacrylic fiber in particular. Paire recite a lengthy list of possible heat-stable fibers in the paragraph bridging columns 2-3 thereof, but does not specify modacrylic fibers, in particular, with wool or viscose for nonwoven (8). As explained in the present application, use of modacrylic fibers in combination with lyocell is significant as the lyocell fibers, upon burning, can char instead of melt (page 4, lines 2-13).

In further distinction from Paire, the present invention purposely avoids the inclusion of para-amid fibers in the "first layer" in order to help mask discoloration that can occur in the "second layer" attributable to the inclusion of such fibers (page 4, lines 14-18). As noted, the blending of modacrylic fibers with lyocell in the first layer allows the lyocell fibers upon burning to form a char instead of melting. In this manner, the nonwoven fabric of the present invention is a synergistically balanced fabric product combining flame-retardancy, structural-stability, soft hand, and strength, so as to maintain the integrity of the fabric upon burning. The flame-retardant nonwoven fabric of the present invention is suitable for end-use applications including, but not limited to, bedding components such as mattress covers and other home uses, protective apparel applications, and other industrial end-use applications.

As another difference with Paire, the present invention does not require a film layer while Paire does. Instead, the present claims recite a fabric having two nonwoven layers of particular blends where the two nonwoven layers are arranged in a directly adjacent, hydroentangled united arrangement.

The Office Action urges that lyocell is a fire retardant material in view of Kierulff. The Office Action also is understood to urge that it would have been obvious to use other fibers such as lyocell in the outer layer (presumably referring to nonwoven (8) of Paire).

The Applicants point out that Kierulff teaches *chemical modification* of oligo- or polysaccharides by an enzymatic process in which a phenol oxidizing enzyme such as peroxidase or laccase is used in combination with an enhancing agent in order to introduce *new functional*

groups in the oligo- or polysaccharide such as carbonyl groups and/or carboxylate (Abstract; col. 5, lines 56-64; claims). In this respect, Kierulff indicates that cotton, viscose, *lyocell*, flax, ramie or blends thereof can be used as a *starting material* that is subjected to the enzymatic oxidation treatment as a preparation for textile manufacture (col. 3, lines 33-46; col. 5, lines 56-64; col. 6, line 63 to col. 7, line 4). Further, Kierulff indicates that the wanted properties will typically achieved by introducing even *further modifications* to the enzymatically-modified oligo- or polysaccharides, such as to introduce flame retardancy and so forth (col. 6, lines 11-26). As can be appreciated, Kierulff indicates that at least two stages of drastic chemical modification would be used to convert a starting oligo- or polysaccharide into a new compound having flame retardancy.

Therefore, Kierulff does not teach or suggest that lyocell *per se* is a flame retardant fiber. At most, the Kierulff reference suggests that new compounds formed by drastically modifying starting materials comprising it via multiple stages of chemical modification to arrive at new chemicals different than lyocell can have that attribute. The present claims recite lyocell *per se* and not chemical derivatives thereof that are chemically different therefrom and are no longer the same or similar as that original material.

Applicants are submitting additional relevant trade literature in a concurrently filed Information Disclosure Statement that shows the recognition in the art that "lyocell" fiber is a term of art that has an art recognized meaning, which can be understood to be significantly different than phenol oxidized polysaccharides per Kierulff, or FR viscose or FR cotton per Paire.

As confirmed by the technical literature of the manufacturer (i.e., Lenzing AG) of TENCEL® brand lyocell fiber, such as used in the Example disclosed in the present application (page 8, line 18), lyocell is "natural cellulose fiber" (see, e.g., page 2 thereof). The trade literature of LotusOrganics that also has been cited describes in detail how lyocell fiber is manufactured (pages 2-4) and that Tencel® is a name brand thereof (pages 1, 4). As explained in detail by the LotusOrganics article, lyocell is a natural, man made fiber produced by creating a solvent solution of wood pulp, spinning lyocell fiber from the solvent solution, washing lyocell fiber to remove solvents, drying fiber and producing yarns, and finishing to produce lyocell fabric. As confirmed by the LotusOrganics article, no flame retardants are incorporated into or onto the lyocell fiber, nor are they phenol oxidized. The LotusOrganics article explains that

"[n]o chemical intermediates are formed during the solvent and spinning processes ... This is the rationale for calling Lyocell a man-made fiber that is natural in origin" (page 3, "Step 3"). The term "lyocell" is therefore recognized as a term of art by persons of ordinary skill in the art that would not encompass flame-retardant, chemically-modified fiber materials that may have used lyocell as a starting material for the reactions. Moreover, the LotusOrganics article, at page 2 thereof, refers to blending lyocell with other natural fibers, but not modacrylic or modacrylic and para-aramid fibers. Regarding FR viscoses, such as mentioned by Paire as a possible choice for the heat-stable fibers described therein, the separately cited technical article of Lenzing AG entitled "FR®-Fiberstory - the heat protection fiber" teaches at page 1 thereof that "Lenzing FR®" is a specialty viscose fiber in which natural raw material fiber is modified to have a "*a flame retardant substance incorporated throughout the cross section of the fiber*". As such, FR viscoses (and FR cottons), such as those mentioned by Paire, are not lyocell. With their emphasis on using fibers that have been modified to impart heat-stability or flame retardancy thereto, Kierulff and Paire teach away from the use of lyocell *per se* in nonwoven fabric layers.

As pointed out in the Applicants' previous response, the Kelly reference discloses the advantages of blending aramid fibers and *melamine* fibers to create a flame retardant fabric, but does not discuss or disclose the recited elements of the currently pending claims (See paragraphs [0016], [0017], [0021] and [0024]of Kelly). The descriptions of the background art in paragraphs [0002] to [0015] of Kelly teach a wide variety of fibers and fiber blends, all of which are different than those presently claimed for either of the recited first or second nonwoven layers of the fabric that is presently claimed. Kelly leads one of ordinary skill away from the fiber blends recited for the nonwoven layers of the fabric that is presently claimed.

In view of the above, the relied upon references for this rejection, either individually or in the proposed combination, fails to teach or suggest every claimed recitation. The present claims are not rendered *prima facie* obvious over the references.

In view of the above, reconsideration and withdrawal of this rejection is requested.

It is believed that this application is in condition for allowance, and notice of such is respectfully requested.

If the Examiner believes that a teleconference would be useful in expediting the prosecution of this application, the official is kindly invited to contact Applicants' undersigned representative of record.

Respectfully submitted,

/Ramon R. Hoch/
Ramon R. Hoch, Reg. #34108

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Direct Correspondence To:
Customer Number 62753

Valerie Calloway, Esq.
Polymer Group, Inc.
9335 Harris Corners Parkway, Suite 300
Charlotte, North Carolina 28269
(704) 697-5177